



EMISSIONS & NOISE PERVASIVE PANEL

**Noise Summary – Brenda Henderson
Emissions Summary - Chi Lee**

The noise portion of the VAATE Pervasive Panel on Noise and Emission submitted an overview of the current work being performed or funded by the FAA, Navy, and NASA for the August 19 – 20 meeting of the VAATE Steering Committee. The FAA highlighted the CLEEN, PARTNER, and MAGENTA programs. NASA showed recent results for scale-model and flight data for the GE 404 and 414 class engines. The Navy presented short term plans for noise reduction in the F-18 E/F/G.



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NOISE



Objectives

- Provide interagency coordination of technology development, aimed at engine noise reduction.
- Provide recommendations to the Steering Committee on potential areas of interagency technology collaboration to maximize the use of government investments in noise reduction.
- Serve as a forum for information and technology exchange in order to coordinate gas turbine engine environmental strategies and policies among the member agencies and industry
- Coordinate activities across panel representatives.
- Communicate progress to VAATE steering committee.



Role of Panel

- Provide input to VAATE Steering Committee on noise reduction features that should be considered by engine development programs such as ADVENT.
- Try to impact design process by encouraging industry participants on noise panel to attend internal meetings within their company.
- Provide coordination across government agencies for future solicitations to eliminate overlap and jointly participate in reviews.



Panel Members

Government

- Brenda Henderson (Chair), NASA
- James Bridges, NASA
- Charlotte Whitfield, NASA
- John Spyropoulos, NAVAIR
- Richard McKinley, Air Force
- Lourdes Maurice, FAA
- James Skalecky, FAA

Industry (have not met with industry yet)

- Robert Schlinker (UTRC/P&W)
- William Dalton (Rolls-Royce)
- TBD



Summary of Highlights

- **FAA**

CLEEN - Continuous Low Energy, Emissions and Noise Program

- FAA funding requested in President's FY-09 budget for program start
- Focused on reducing current levels of aircraft noise, air quality and greenhouse gas emissions and energy use and advancing alternative fuels for aviation use
- Technology demonstration at a developmental level that will allow quicker industry uptake
- Market Research Conference held on May 15.
- FAA currently developing solicitation with support from NASA.

PARTNER – conducting new research on noise propagation and published three reports of interest to noise (passive sound insulation, rattle and vibration, and land use and community annoyance). Website (www.partner.aero) has report

MAGENTA – study of top 100 U.S. airports includes land military operations.



Summary of Highlights

- **FAA**

Continuous Descent Approach Studies - efforts to implement CDA in the National Airspace System (NAS) continue

ICAO/CAEP Workshop - ICAO/CAEP conducted workshop to assess “Current Scientific Knowledge, Uncertainty and Gaps in Quantifying Climate Change, Noise and Air Quality Aviation Impacts”; report should be released by end of 2008.

Supersonic flight over land - focusing on efforts to look at weather, terrain and post boom effects

NoiseQuest - web-based communication tools to better inform the public about aircraft noise nearly ready for release

Impacts - focusing new research on annoyance and sleep disturbance and health and cognitive performance impacts



Summary of Highlights

- Navy

Drafted Comprehensive ONR/NAVAIR Exhaust Jet Noise Reduction Program for Short/Medium/Long Term

Initiated 3 New Phase II Small Business Innovative Research (SBIR) Grants

- Aero Systems Engineering and General Electric Aviation - develop an efficient small scale testing procedure for the simultaneous measurement of nozzle thrust, noise and flow visualization
- TTC Inc., United Technologies Research Center, and California Institute of Technology - demonstrate an innovative nozzle noise analysis and testing methodology linked for the design of quiet nozzles with minimal performance losses
- Spectral Energies Inc, Ohio State University, and General Electric Global Research Center - dynamically control nozzle large scale turbulent structures for noise and signature reduction by employing plasma actuators

Memorandum of Agreement for a Rapid Technology Transition Program that Meets Short Term F/A-18E/F/G Jet Noise Reduction Goals to be Signed August 2008



Summary of Highlights

- Navy

Short term F-18 E/F/G noise reduction – mechanical chevrons

- The *only* concept retrofit-able to current aircraft
- Chevron development has received significant funding by NASA & OEMs over last 15 yrs for civilian applications
- Demonstrated by ONR to TRL 6 (engine test) 9/07 for tactical applications
- A technology transition program is required - chevrons may be implemented on the F414 by redesigning the nozzle seals alone with minimal impact on weight, performance, durability, and maintainability
- Next steps
 - demonstrate noise reduction at max A/B conditions
 - transition design to installation on the F-18 E/F/G
 - evaluate performance and operability impact throughout the flight envelope
 - perform detailed design of the production seals



Summary of Highlights

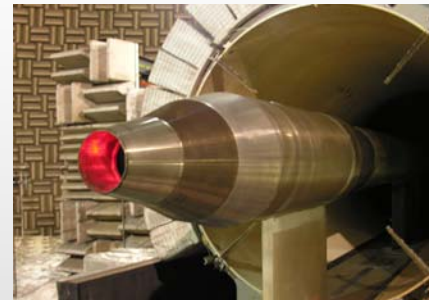
- NASA

Strategic Environmental Research and Development Program (SERDP)

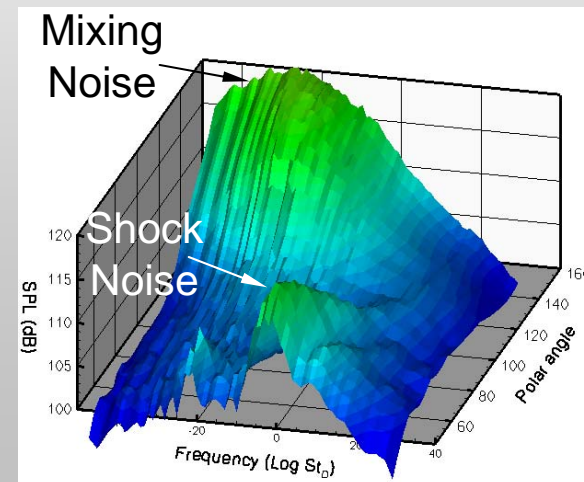
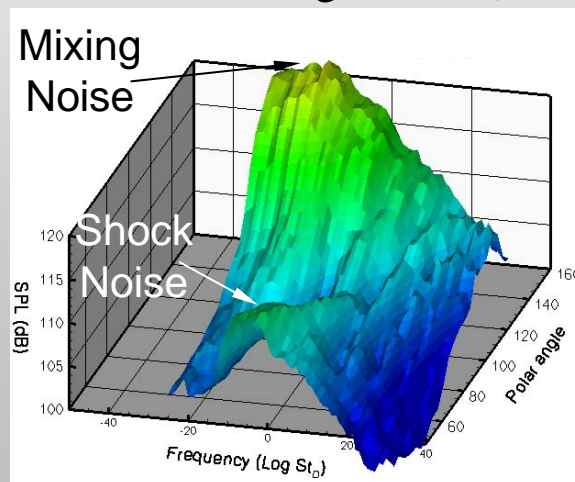
- Comparisons of flight data and data from model scale nozzles similar to those of the GE 404 and 414 class engines
- Chevron noise reduction tests begin next year



F-15 ACTIVE Flight Test (1997)



Moderate Scale Tests





Summary of Highlights

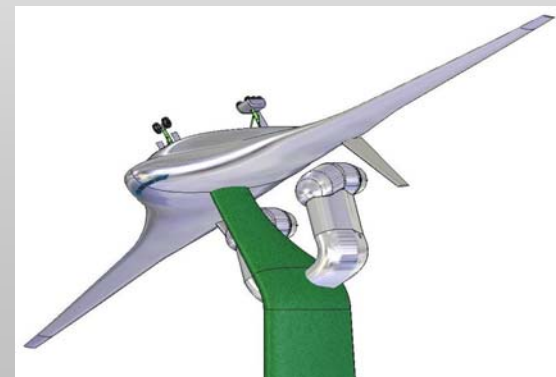
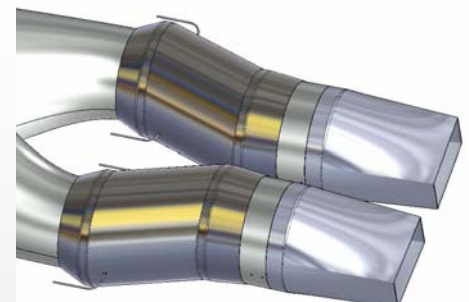
Twin jet study – investigate jet plume interactions and noise characteristics of circular and rectangular nozzles

NASA Research Announcements (NRA)

- Rolls-Royce funded to design and fabricate scale model of a high fidelity supersonic exhaust system
- Pennsylvania State funded to develop broadband shock noise prediction code

Efficient Low-Noise Hybrid Wing Subsonic Transport

- 5.8% scale model experiments
- Tests performed with realistic engine temperatures and pressures
- Study used to characterize jet noise shielding and airframe noise





Request to Steering Committee

Industry submit names of representatives for inclusion on noise portion of pervasive panel



EMISSIONS